

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of

DAIROKU et al.

Serial No. 10/764,444

Filed: January 27, 2004

For: METHOD OF MANUFACTURING WATER-ABSORBING SHAPED BODY

Conf. No.: 8698

Atty. Ref.: ES-1035-492

TC/A.U.: 1791

Examiner: Huson, M. A.

September 17, 2010

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellants submit this Brief to appeal the Examiner's final rejections as set forth in his Office Action mailed March 17, 2010 (the "final Office Action"). The fee required under 37 CFR § 41.20(b)(2) is submitted herewith.

The Notice of Appeal was filed on June 17, 2010. The Brief was initially due on August 17, 2010. Appellants petition for a one- month extension of the period for response and attach the required fee in accordance with 37 CFR § 1.136. Therefore, Appellants believe that this Appeal Brief, filed on September 17, 2010, is timely. However, if any fee is required to consider this Appeal Brief is missing or deficient, Appellants petition for any extension necessary and authorize the fee (or any deficiency therein) to be charged to Deposit Account 14-1140 under Order No. ES-1035-492.

Reversal of the Examiner's rejections of claims 1-3 and 6-22 by the Board of Patent Appeals and Interferences (the "Board") is respectfully requested.

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(I) **REAL PARTY IN INTEREST**

The real party in interest is NIPPON SHOKUBAI CO., LTD., a corporation of the country of Japan. The assignment was recorded on Reel/Frame: 015840/0400 with a correction recorded at Reel/Frame 014936/0605.

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(II) RELATED APPEALS AND INTERFERENCES

The appellant, the undersigned, and the assignee are not aware of any related appeals, interferences, or judicial proceedings (past or present), which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

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(III) STATUS OF CLAIMS

Claims 1-3 and 6-22 are pending and have been rejected. They are at issue in this appeal and listed in the Claim Appendix. No claims have been substantively allowed.

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(IV) STATUS OF AMENDMENTS

No amendments have been filed since the date of the Final Rejection.

(V) **SUMMARY OF CLAIMED SUBJECT MATTER**

Independent claim 1 involved in this appeal is directed to a method of manufacturing a water-absorbing shaped body, comprising the steps of: polymerizing an aqueous solution including a photo polymerization initiator, a radical polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution; applying heat after the light is radiated; shaping the polymerized aqueous solution; and drying the water-absorbing shaped body obtained after the polymerization.

The subject matter of claim 1 is supported throughout the originally filed disclosure such as, for example, on page 6, line 2 to page 7, line 16; page 12, lines 4-23; page 17, lines 8-23; page 20, lines 17-22; page 21, lines 1-8; page 25, line 17 to page 26, line 1; page 31, line 24 to page 32, line 2; and page 36, line 6 to page 38, line 10. Therefore, the invention as presently claimed is clearly supported by Appellant's disclosure as originally filed.

Independent claim 7 involved in this appeal is directed to a method of manufacturing a water-absorbing shaped body, comprising the steps of: a first polymerization step of radiating light onto an aqueous solution including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to polymerize a part of the water-soluble ethylenically unsaturated monomer to thicken the aqueous solution; a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step, so that a rest of the water-soluble ethylenically unsaturated monomer is polymerized, the aqueous

solution having been shaped and including the polymer as a part thereof.

The subject matter of claim 7 is supported throughout the originally filed disclosure such as, for example, on page 4, line 13; page 5 line 2; page 6, line 2 to page 7, line 16; and page 14, line 22 to page 15, line 21. Therefore, the invention as presently claimed is clearly supported by Appellant's disclosure as originally filed.

Independent claim 21 involved in this appeal is directed to a method of manufacturing a water-absorbing shaped body, comprising the steps of: polymerizing an aqueous solution without the presence of a thickening agent and including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution until the aqueous solution becomes viscous and shapeable; shaping the polymerized aqueous solution; and drying the water-absorbing shaped body obtained after the polymerization.

The subject matter of claim 21 is supported throughout the originally filed disclosure such as, for example, on page 4, line 5; page 5, line 10; page 6, line 2 to page 7, line 16; page 12, lines 4-23; page 17, lines 8-23; page 20, lines 17-22; page 21, lines 1-8; page 25 line 17 to page 26, line 1; page 31, line 24 to page 32, line 2; and page 36, line 6 to page 38, line 10. Therefore, the invention as presently claimed is clearly supported by Appellant's disclosure as originally filed.

Independent claim 22 involved in this appeal is directed to a method of manufacturing a water-absorbing shaped body, comprising the steps of: a first polymerization step of radiating light onto an aqueous solution not containing a thickening agent and including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to polymerize a part of the water-

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soluble ethylenically unsaturated monomer to thicken the aqueous solution until a shapeable viscosity is obtained; a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step, so that a rest of the water-soluble ethylenically unsaturated monomer is polymerized, the aqueous solution having been shaped and including the polymer as a part thereof.

The subject matter of claim 22 is supported throughout the originally filed disclosure such as, for example, on page 4, lines 5-13; page 5, line 2-10; page 6, to page 7, line 16; and page 14, line 22 to page 15, line 21. Therefore, the invention as presently claimed is clearly supported by Appellant's disclosure as originally filed.

(VI) GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. Under 35 U.S.C. § 103(a), was it proper to reject claims 1-3, 6-11 and 13-22 as allegedly unpatentable over Golander et al. (U.S. Patent No. 4,840,851) in view of Vesley et al. (U.S. Patent No. 6,960,275).

B. Under 35 U.S.C. § 103(a), was it proper to reject claim 12 as allegedly unpatentable over Golander et al. (U.S. Patent No. 4,840,851) and Vesley et al. (U.S. Patent No. 6,960,275), and further in view of Phan et al. (U.S. Patent No. 6,022,610).

Appellants respectfully state that these rejections were not proper and offer the following arguments in support of their statement.

(VII) ARGUMENT

The pending claims should be considered in two groups. Group 1 includes claims claims 1-3, 6-11 and 13-22. Group 2 includes claim 12.

Under U.S. Patent Law, 35 U.S.C. §103, to establish a case of prima facie obviousness, all of the claim limitations must be taught or suggested by the prior art. See M.P.E.P. § 2143.03. A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. *In re Kahn*, 78 USPQ2d 1329, 1334 (Fed. Cir. 2006) citing the legal standard provided in *Graham v. John Deere*, 148 USPQ 459 (1966). The *Graham* analysis needs to be made explicitly. *KSR v. Teleflex*, 82 USPQ2d 1385, 1396 (2007). It requires findings of fact and a rational basis for combining the prior art disclosures to produce the claimed invention. See *id.* (“Often, it will be necessary for a court to look to interrelated teachings of multiple patents . . . and the back-ground knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue”). The use of hindsight reasoning is impermissible. See *id.* at 1397 (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning”). Thus, a rejection under Section 103(a) requires “some rationale, articulation, or reasoned basis to explain why the conclusion of [prima facie] obviousness is correct.” *Kahn*, 78 USPQ2d at 1335; see *KSR*, 82 USPQ2d at 1396.

35 U.S.C. 103 - Appellants' Reasons Why Claims 1-3, 6-11 and 13-22

Should Be Considered Nonobvious

Claims 1-3, 6-11 and 13-22 stand rejected under 35 U.S.C. 103 as allegedly obvious in view of a combination of Golander (U.S. Patent No. 4,840,851) and Vesley (U.S. Patent No. 6,960,275). Appellants traverse because the claimed invention is patentable over the cited references at least for the following reasons:

1. There are significant and patentable differences between the claimed invention and the cited references.

The claimed invention is directed to a method of manufacturing a water-absorbing shaped body which can be produced to avoid the use of thickening agents and thus to avoid (1) handling problems and high labor costs due to high viscosity when thickening agents are used and (2) deteriorating performance of water-absorbing shaped bodies produced with thickening agents. See, Appellants' Specification, page 3, last paragraph. To achieve this goal, the claimed methods, in one embodiment, include the steps of: (1) polymerizing an aqueous solution including a photo polymerization initiator, a radical polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution; (2) applying heat after the light is radiated; (3) shaping the polymerized aqueous solution; and (4) drying the water-absorbing shaped body obtained after the polymerization. In another embodiment, the claims refers to the steps of (1) a first polymerization step of radiating light onto an aqueous solution including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to

polymerize a part of the water-soluble ethylenically unsaturated monomer to thicken the aqueous solution; (2) a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and (3) a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step. See, e.g., instant claims 1, 7, 21 and 22 for a detailed description. Significantly, none of these problems were recognized and none of the solutions were made obvious by a combination of Golander or Vesley.

In contrast to the current Application, Golander is in “the field of surface coating of a substrate” that is applying a polymeric coating containing ethylene oxide units as the primary structural units; *see* Golander, column 1, lines 7-10. While Gölander describes the curing of a polymeric product, there is no discussion or suggestion in Golander to the shaping a partially cross-linked gel. Furthermore, the materials used in Gölander are quite distinct from those specified by the claims of the present application (see discussion in detail below).

Vesley is cited for a procedure in which a viscous aqueous solution is (1) polymerized by irradiating the aqueous solution with light and (2) shaped into a film. There is no disclosure in Vesley of (a) initial irradiation, (2) completely stopping the radiation with light, (3) shaping the thickened aqueous solution in a shaping step and followed by (4) final irradiation and cure. As with Golander, Vesley uses a very different polymeric solution primarily based on viscoelastic materials; *see* Vesley, column 1, lines 18-20 and a more detailed discussion at column 6, lines 28-39. Vesley’s viscoelastic pressure sensitive materials are prepared using a release surface to which the materials are applied then irradiated or otherwise cured. Therefore, like Golander, Vesley is very different from the claimed invention.

2. A combination of the cited references fails to disclosed the composition of the claimed method.

The claimed invention is not obvious in view of a combination of Golander and Vesley because a combination of the references would not render obvious all of the limitations of the claims. The claimed invention is directed to, inter alia, methods of manufacturing a water absorbing shaped body by polymerizing an aqueous solution with a water-soluble ethylenically unsaturated monomer containing "at least 50 mol% of acrylic acid, an acrylic acid salt or both." Further, claims 19 and 20 further limits the mol% of acrylic acid, an acrylic acid salt or both to 80% or 95% respectively. These limitations are not disclosed or render obvious by a combination of Golander and Vesley. As discussed in the previous section, the materials of Golander, Vesley, or a combination of the two references are very different from the claimed material. Neither of these references, either considered in combination or separately, describes or render obvious that which Appellants have directed their claims, namely an acrylic acid or an acrylic acid salt or both which constitutes at least half (claim 1), and likely more, up to 80 mol% (claim 19) or 95 mol% (claim 20), of the ethylenically unsaturated monomer. Since 50 mol% of an acrylic acid or an acrylic acid salt or both is not obvious, it follows that a further higher range of up to 80 mol% (claim 19) or 95 mol% (claim 20) is also non-obvious.

3. The cited references does not disclose the use of a radical polymerization initiator or the application of heat after light.

Second, with respect to claim 1 and claims dependent thereon, neither Golander nor Vesley discloses or render obvious the claimed of features of (1) an aqueous solution with a radical polymerization initiator and (2) applying heat after the light is radiated.

Golander does not disclose the use of a composition comprising a free radical polymerization initiator in combination with a water-soluble ethylenically unsaturated monomer containing “at least 50 mol% of acrylic acid, an acrylic acid salt or both.” While Golander refers to a radical initiator, it is only in the context of Golander’s specific compositions which, as described above, is very different from the claimed compositions. Vesley is silent with respect to a free radical polymerization initiator so the addition of Vesley to Golander cannot cure the defects of Golander.

With respect to the second point, the Examiner has acknowledged on page 3 line 8 of the Office Action, Golander does not show apply heat after light radiation. The passage in Vesley which the Examiner points out as disclosing applying heat after the light is radiated is actually referring to the technical feature of polymerization by applying heat instead of radiating light. In addition, unlike the claimed invention, Vesley never discloses the combination of polymerization followed by shaping followed by a second polymerization after shaping. Also, neither Golander and Vesley discloses the application of heat, after light, on Appellants’ claimed composition comprising an acrylic acid or an acrylic acid salt or both which constitutes at least half (claim 1), and likely more, up to 80 mol% (claim 19) or 95 mol% (claim 20), of the ethylenically unsaturated monomer

Furthermore, in the present invention (the invention recited in independent claim 1), a heat source in “applying heat after the light is radiated” is intended and implicit to be the heat of polymerization instead of heat applied from an external source. Though there is no description in the specification with regard to this point, it is common general technical knowledge known to a person skilled in the art that heat, which is generated by the polymerization, increases the temperature of the aqueous solution; namely, the heat is applied to the aqueous solution.

Accordingly, a distinction from the prior art is that Appellants are able to use with advantage the heat generated from the polymerization reaction which is used for “applying” or generating heat after the intermittent radiating light is employed. None of these points are rendered obvious by a combination of Golander and Vesley.

4. The cited references fail to disclose the drying the water-absorbing shaped body subsequent to polymerization.

Claims 1 and 21 recite, in addition to polymerization, two additional steps of (1) shaping the polymerized aqueous solution, and (2) drying the water-absorbing shaped body obtained subsequent to polymerization. In contrast to the claimed invention, Golander failed to teach the step of drying a water-absorbing shaped body obtained from polymerization. The addition of Vasley does not cure the defects of Golander. Vasley, like Golander, is silent with respect to drying.

5. The combination of the cited references does not disclose shaping of a partially polymerized solution or two polymerization steps.

A combination of Golander and Vesley does not render obvious procedures recited in Appellants’ claims (see, e.g., claims 7-15, 17, 18, and 22) where there is a first polymerization step to polymerize part of the monomer and thicken the aqueous solution followed by stopping the radiation, a shaping step to shape the thickened aqueous solution which is then followed by a second polymerization to polymerize the solution. While Golander describes at column 7, lines 11-26, partial then final curing, it is important to note Appellants’ claimed shaping step, for the shaping of a partially cross-linked gel, is not disclosed or rendered obvious by Golander. As

discussed above, Golander describes reagents that are quite distinct from those specified by the claims of the present application. That is, not only does Golander not describe the shaping of a partially cross-linked gel, Golander does not describe the shaping of a partially cross-linked gel with a water-soluble ethylenically unsaturated monomer containing "at least 50 mol% of acrylic acid, an acrylic acid salt or both."

The defects of Golander, as outlined above, are not cured by the addition of Vesley. Vesley, actually does not disclose the claimed steps because there is no disclosure in Vesley of initial irradiation, completely stopping the radiation with light, shaping the thickened aqueous solution in a shaping step and followed by final irradiation and cure. Appellants submit that the part of Vesley which is indicated by the examiner as pertinent fails to disclose a shaping step. Specifically as evidenced by Figure 1, the part of Vesley which is indicated by the examiner to be pertinent merely discloses coating a curable composition onto a surface and curing said coating while the coating is peeled off. Significantly, Vesley's process completely fails to disclose an arrangement corresponding to the arrangement of (1) stopping the radiation of light, and (2) shaping an aqueous solution which includes a polymer as a part thereof (a shaping step). Appellants note that Vesley does not show anywhere that the shape of the product is changed. That is, the Vesley shows a process where an article is treated by multiple sources. There is no indication that the radiation of light is stopped and there is no indication that a shaping process is involved between two polymerizations - of course, since there is no stoppage, it cannot be considered two polymerizations (see Vesley, column spanning cols. 4 and 5). Vesley is merely treating a product with two sources in Figure 1 without any indication that the article changes shape. For this reason, a combination of Golander and Vesley would not lead to the claimed

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invention. Also, as with Golander, Vesley also uses a very different polymeric solution from Appellants' claims.

In view of Appellants' statement above, Appellants urge the Board to reverse the obviousness rejection because the invention as claimed would not have been obvious to a person of ordinary skill in the art at the time it was made.

35 U.S.C. 103 - Appellants' Reasons Why Claims 12

Should Be Considered Nonobvious

Claim 12 stands rejected under 35 U.S.C. 103 as allegedly obvious in view of a combination of Golander (U.S. Patent No. 4,840,851), Vesley (U.S. Patent No. 6,960,275) and Phan (U.S. Patent No. 6,022,610). Appellants traverse.

The Office Action takes the position that Golander and Vesley teach all the claim limitations except for a fiber substrate and that Phan provides teaching of fiber substrates. Appellants disagree.

Appellants note that Phan discloses that "deposition of an osmotic absorbent onto a capillary substrate according to the prior art can present numerous problems (see, Phan, col. 2, lines 10-44). To overcome these problems, Phan uses (1) specific absorbents with a proximal end jointed to the fibrous capillary substrate and (2) a distal end freestanding from said capillary substrate, (3) a fibrous capillary substrate comprising regions of two different densities with a plurality of discrete low density regions and (4) wherein said sites of the osmotic absorbent hydrogel polymers are disposed on said low density regions to overcome these many problems (see, Phan, claims). Phan's disclosure of the many problems and the specific structures needed to overcome these problems is a teaching against the use of any water absorbing shaped bodies in

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any fiber substrates unless they fit Phan's strict criteria discussed above. The Office Action also fails to show that Golander and Vesley's compositions would fit Phan's strict criteria. Thus, there is no indication such a combination of three references would work.

Appellants further note that claim 12 depends on claim 7 which, as stated above, is not obvious in view of the cited references. Claims depending from independent claim 7 are also not rendered obvious by the cited documents because all limitations of the independent claim are incorporated in its dependent claims. M.P.E.P. § 2143.03 citing *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988).

In view of Appellants' statement above, Appellants urge the Board to reverse the obviousness rejection because the invention as claimed would not have been obvious to a person of ordinary skill in the art at the time it was made.


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CONCLUSION

In conclusion it is believed that the application is in clear condition for allowance; therefore, early reversal of the Final Rejection and passage of the subject application to issue are earnestly solicited.

Respectfully submitted,

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(VIII) CLAIMS APPENDIX

1. (Previously Presented) A method of manufacturing a water-absorbing shaped body, comprising the steps of:

polymerizing an aqueous solution including a photo polymerization initiator, a radical polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution;

applying heat after the light is radiated;

shaping the polymerized aqueous solution; and

drying the water-absorbing shaped body obtained after the polymerization.

2. (Original) The method as set forth in claim 1, wherein:

the aqueous solution is polymerized on a surface of another base material or inside another base material.

3. (Original) The method as set forth in claim 1, wherein:

the aqueous solution before the light is radiated includes a cross-linking agent in advance.

4-5. (Canceled).

6. (Previously Presented) The method as set forth in claim 1, wherein:

the aqueous solution is shaped into at least one shape selected from the group consisting of a string shape, a fiber shape, a sheet shape, a film shape, a cubic shape, and a spherical shape.

7. (Previously Presented) A method of manufacturing a water-absorbing shaped body, comprising the step of:

a first polymerization step of radiating light onto an aqueous solution including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to polymerize a part of the water-soluble ethylenically unsaturated monomer to thicken the aqueous solution;

a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and

a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step, so that a rest of the water-soluble ethylenically unsaturated monomer is polymerized, the aqueous solution having been shaped and including the polymer as a part thereof.

8. (Original) The method as set forth in claim 7, wherein:

the aqueous solution before the first polymerization step is performed includes a cross-linking agent in advance.

9. (Original) The method as set forth in claim 7, wherein:

the second polymerization step is performed on the aqueous solution which is being shaped and which includes the polymer as a part thereof.

10. (Original) The method as set forth in claim 7, wherein:
the aqueous solution further includes a radical polymerization initiator other than the photo polymerization initiator.

11. (Original) The method as set forth in claim 7, wherein:
polymerization is furthered by applying heat in the second polymerization step.

12. (Original) The method as set forth in claim 7, wherein:
the shaping step is performed on a fiber base material or inside a fiber base material.

13. (Original) The method as set forth in claim 7, wherein:
the shaping step is performed right after the first polymerization step.

14. (Original) The method as set forth in claim 7, wherein:
the first polymerization step and the shaping step are performed on a continuous belt.

15. (Previously Presented) The method as set forth in claim 7, wherein:
the aqueous solution is shaped into at least one shape selected from the group consisting of a string shape, a fiber shape, a sheet shape, a film shape, a cubic shape, and a spherical shape.

16. (Previously Presented) The method as set forth in claim 6, wherein the water-absorbing shaped body is porous.

17. (Previously Presented) The method as set forth in claim 15, wherein the water-absorbing shaped body is porous.

18. (Previously Presented) The method as set forth in claim 1, wherein:
the polymerization is preformed by (i) thickening the aqueous solution irradiating the aqueous solution with light, (ii) stopping irradiating the aqueous solution with light and shaping the aqueous solution into a desired shape, and (iii) further irradiating the aqueous solution with light.

19. (Previously Presented) The method as set forth in claim 1, wherein the water-soluble monomer contains at least 80 mol% of acrylic acid, an acrylic acid salt or both.

20. (Previously Presented) The method as set forth in claim 19, wherein the water-soluble monomer contains at least 95 mol% of acrylic acid, an acrylic acid salt or both.

21. (Previously Presented) A method of manufacturing a water-absorbing shaped body, comprising the steps of:

polymerizing an aqueous solution without the presence of a thickening agent and including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution until the aqueous solution becomes viscous and shapeable;

shaping the polymerized aqueous solution; and
drying the water-absorbing shaped body obtained after the polymerization.

22. (Previously Presented) A method of manufacturing a water-absorbing shaped body, comprising the step of:

a first polymerization step of radiating light onto an aqueous solution not containing a thickening agent and including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to polymerize a part of the water-soluble ethylenically unsaturated monomer to thicken the aqueous solution until a shapeable viscosity is obtained;

a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and

a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step, so that a rest of the water-soluble ethylenically unsaturated monomer is polymerized, the aqueous solution having been shaped and including the polymer as a part thereof.

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(IX) EVIDENCE APPENDIX

None.

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(X) **RELATED PROCEEDINGS APPENDIX**

None.